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EXAMINER	
LUM, LEON YUN BON	
ART UNIT	**PAPER NUMBER**
1641	

DATE MAILED: 05/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/049,366	TAKAHASHI ET AL.	
	Examiner	Art Unit	
	Leon Y. Lum	1641	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 February 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16,20-27 and 31-34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16,20-27 and 31-34* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *5/13/02; 2/11/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

RD

DETAILED ACTION

1. The amendment filed 14 February 2005 is acknowledged and has been entered.

Claim Objections

2. Claim 12 is objected to because of the following informalities: The term "and" seems to be missing between the terms "part" and "infiltrating" in line 14. Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-16, 20-27, and 31-34 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. In claim 1, lines 9-10, the phrase "for adding the liquid specimen to the reagent holding part" is vague and indefinite. It is unclear whether the phrase is directed from the "carrier" (line 8) or the "at least a part of an area from a specimen addition part" (line 9).

6. In claims 12 and 23, lines 4-5, the phrase "and analyzing components in the analyte in a liquid specimen" is vague and indefinite. It is unclear whether the instant phrase refers to the "biosensor" (line 2) or the "reagent holding part" (line 3).

7. In claims 12 and 23, lines 4-5 and 21, the phrase "components in the analyte" is vague and indefinite. It is unclear whether the claimed invention is directed to components that are analytes or components that are in an analyte. The specification provides disclosure of blood components including metabolites, proteins, lipids, electrolytes, enzymes, antigens, and antibodies (see page 1, 2nd paragraph). Is the claimed invention directed to components that are blood components, or to components within the said blood components? The recitation of the term "in" in the instant phrase makes the claimed invention seem like it is directed to components within the said blood components, to which the specification does not provide support.

8. In claims 12 and 23, lines 11-12, the phrase "from a specimen addition part for adding the liquid specimen to the reagent holding part" is vague and confusing. It is unclear what the phrase is claiming. Due to the term "from", the claim can be interpreted to indicate that the "cell shrinking reagent" (line 10) is transferred to an area from the specimen addition part in order to add the liquid specimen to the reagent holding part. In addition, the claim can also be interpreted to indicate that the function

of the specimen addition part is to add liquid specimen to the reagent holding part. Which situation is actually claimed by the instant phrase?

9. In claims 12 and 23, line 14, the term "blood specimen" is vague and confusing. It is unclear whether the instant term is the same as the "liquid specimen" (line 5) recited earlier and if not, then how the two terms are related.

10. In claim 12, lines 16-17, and claim 23, lines 17-18, the phrase "with the dissolved cell shrinkage reagent" is vague and indefinite. The specification does not define the phrase and it is unclear whether the cell shrinkage reagent is also shrunk, or whether the cell shrinkage reagent is the cause of the shrinking of the cell components. The recitation of the term "with" includes the situation wherein both cell components and cell shrinkage reagents are simultaneously shrunk.

11. In claim 12, lines 17-18, the phrase "and the shrunk cell components are separated and chromatographically developed" is vague and indefinite. The specification does not provide a definition for the phase and it is unclear as to what the term "chromatographically developed" means. The specification recites the term "chromatographically developed part" (page 4, 3rd paragraph), but does indicate how the term limits the claimed invention. Is instant phrase directed towards determining the presence of the components, movement of components, a combination of both, or

another limitation that is not stated? The term "developed" indicates that something is produced and therefore seems to be directed at the result of a chromatographic assay.

12. Claims 12 and 23 recite the limitation "the cell shrinkage agent carrying area" in line 15. There is insufficient antecedent basis for this limitation in the claims.

13. Claims 12 and 23 recite the limitation "the analyte in the blood specimen" in line 19. There is insufficient antecedent basis for this limitation in the claims.

Claim Rejections - 35 USC § 102

14. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

15. Claims 1-4, 7-14, 21-25, and 31-34 are rejected under 35 U.S.C. 102(b) as being anticipated by Killeen et al (US 5,166,051).

In the instant claims, Killeen et al teach a diagnostic test strip (i.e. biosensor) for chemical or immunological assay of whole blood analytes that comprises a substrate, a porous detection zone membrane affixed to the substrate (i.e. porous material), and an overlay membrane affixed to the substrate and in overlying and continuous contact with the detection zone membrane, wherein the detection zone membrane contains an

activated colorimetric indicator for determining a select analyte constituent in the whole blood (i.e. reagent hold part holds a reagent for marking an analyte). See column 2, lines 54-67. In addition, Killeen et al teach that the overlay membrane (i.e. carrier; specimen addition part) comprises a porous membrane of varying thickness containing a crenating agent (i.e. cell shrinking reagent) which functions to deplete the volume of fluid within the red blood cell, wherein once the cell becomes crenated or has been shrunk, it is much less malleable and flexible and becomes rigid, and in turn, less able to penetrate into the pores of the detection zone membrane (i.e. cell components are separated). See column 5, lines 5-14 and 36-41. Furthermore, Killeen et al teach the step of analyzing a signal generated from the detection zone membrane to determine the presence of any analyte, wherein the analyte is allowed to enter the detection zone once it is released from the solution of red blood cells (i.e. chromatographically developed). See column 5, lines 41-47 and column 8, lines 51-58. Although Killeen et al does not explicitly teach that the shrunk cell components are "chromatographically developed", the reference does not teach that crenated cells are immobilized immediately after being shrunk. Since Killen et al teach that the overlay membrane consists of a certain thickness (See column 9, lines 39-47 and Figure 4) and that crenated cells are trapped only at the surface of the detection zone membrane (see column 5, lines 41-44), the reference anticipates the situation wherein crenated cells flow through the overlay membrane prior to being stopped at the interface between the overlay membrane and the detection zone membrane. Therefore, since travel of

crenated cells is included in the teachings of Killeen et al, the reference teaches the limitation of shrunk cell components that are "chromatographically developed".

With regards to claims 3, Killeen et al teach that analytes include bacteria. See column 6, lines 17-18.

With regards to claims 4, 14, and 25, Killeen et al teach that preferred crenating agents are inorganic salts. See column 5, lines 48-56.

With regards to claims 7-9, 11, 22, and 33, Killeen et al teach that the test strips are dry. See column 8, lines 40-44. With regards to claims 7-9, the limitations "dried naturally or dried by air-drying", "dried by freeze-drying", and "dried by heat drying" are product-by-process claims and therefore not given patentable weight. Accordingly, only the structural limitation of a carrier that carries the cell shrinkage reagent, wherein the carrier is dry, has been considered.

With regards to claims 10, 21, and 32, Killeen et al teach that the test strip contains a labeled reagent zone, a second trapping zone, and a third detection zone for label detection (i.e. one-step immunochromatographic test strip). See column 8, line 59 to column 9, line 24.

With regards to claims 31 and 34, Killeen et al teaches that overlay membranes were impregnated with one molar NaCl solution (i.e. concentration of cell shrinkage reagent is 0.1 ~ 5.0 M or 0.5 ~ 5.0 M). See column 11, lines 18-20 and column 12, lines 4-5.

Claim Rejections - 35 USC § 103

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

17. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

18. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

19. Claims 5-6, 15-16, and 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Killeen et al (US 5,166,051) in view of Fruitstone et al (US 4,259,207).

Killeen et al reference has been disclosed above, but fails to teach that the cell shrinkage reagent is amino acid or saccharide.

Fruitstone et al teach that solutes such as amino acids and sugars may be employed to control osmolality, in order for cells to become crenated if the osmolality of the solution is too high. See column 3, lines 3-20.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Killeen et al, with solutes such as amino acids and sugars that may be employed to control osmolality, as taught by Fruitstone et al, in order for cells to become crenated if the osmolality of the solution is too high. One of ordinary skill in the art at the time of the invention would have had reasonable expectation of success in including amino acid or sugar, as taught by Fruitstone et al, in the method of Killeen et al, since Killeen et al teach that the crenating agent may be any constituent or composition which effectively reduce the volume of water in blood cells (see column 5, lines 48-51), and amino acids and sugars are examples of constituents that reduce the volume of water in blood cells.

20. Claims 6, 16, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Killeen et al (US 5,166,051) in view of Cremins (US 4,978,624).

Killeen et al reference has been disclosed above, but fails to teach that the cell shrinkage reagent is saccharide.

Cremins et al teach a high solute concentration of a reagent solution with sugar content, in order to crenate blood cells. See column 5, lines 3-10.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Killeen et al, with a high solute concentration of a reagent solution with sugar content, as taught by Cremins et al, in order to crenate blood cells. One of ordinary skill in the art at the time of the invention would have had reasonable expectation of success in a reagent solution with sugar, as taught by Cremins et al, in the method of Killeen et al, since Killeen et al teach that the crenating agent may be any constituent or composition which effectively reduce the volume of water in blood cells (see column 5, lines 48-51), and sugar is one example of a constituent that reduce the volume of water in blood cells.

21. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Killeen et al (US 5,166,051) in view of Maimon et al (US 5,350,693).

Killeen et al reference has been disclosed above, but fails to teach that the concentration of the cell shrinkage reagent is 0.05 ~ 0.3 M.

Maimon et al teach a hypertonic media with 0.3 M NaCl, in order for the hypertonic media to produce shrinking of cells. See column 6, lines 35-36 and 45-47.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Killeen et al, with hypertonic media with 0.3 M NaCl,

as taught by Maimon et al, in order for the hypertonic media to produce shrinking of cells. One of ordinary skill in the art at the time of the invention would have had reasonable expectation of success in including hypertonic media with 0.3 M NaCl, as taught by Maimon et al, in the method of Killeen et al, since Killeen et al teach that the crenating agent may be any constituent or composition which effectively reduce the volume of water in blood cells (see column 5, lines 48-51), and NaCl at a concentration of 0.3 M is an example of a constituent that reduces the volume of water in blood cells.

Double Patenting

22. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

23. Claims 1-11 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-19 of copending Application No. 10/398,711. Although the conflicting claims are not identical,

they are not patentably distinct from each other because the limitations of the instant application are taught by the claims of the copending application.

The instant application recites a biosensor that is made of a single layer or plural layers of a porous material, said biosensor having a reagent holding part which holds a reagent for marking an analyte in a liquid specimen by utilizing chromatography, comprising a carrier for carrying a cell shrinkage reagent having the ability of making cell components shrink on at least a part of an area from a specimen addition part for adding the liquid specimen to the reagent holding part. In addition, the instant application recites a method of employing the said biosensor with a cell shrinkage reagent having the ability of making cell components shrink is carried on at least a part of an area from a specimen addition part for adding the liquid specimen to the reagent holding part, and recites the steps of the cell shrinkage reagent is dissolved from the area carrying the cell shrinkage reagent by blood specimen added to the specimen addition part infiltrating into the cell shrinkage agent carrying area, the cell components included in the blood specimen are shrunk with the dissolved cell shrinkage reagent, and the shrunk cell components are separated and chromatographically developed, and the analyte in the blood specimen which is chromatographically developed is marked with the reagent which has been held in the reagent holding part and components in the analyte in the blood specimen are analyzed.

With respect to claims 1-11 of the instant application, claims 1-19 of the copending application teaches a biosensor made of a dried porous material (i.e. made of a layer of porous material) and comprises a marker reagent holding part, whereby

reaction among an analyte in a sample solution, marker reagent, and immobilized reagent occurs (i.e. for marking an analyte in a liquid specimen). The copending application also teaches a cell contraction agent holding part. However, the copending application does not teach a carrier for carrying a cell shrinkage reagent.

It would have been obvious to one of ordinary skill in the art at the time of the invention to substitute a cell contraction agent holding part, as taught by the copending application, for the carrier, since both embodiments store reagents that shrink cell components in blood sample. One of ordinary skill in the art at the time of the invention would have had reasonable expectation of success in substituting the cell contraction agent holding part for the carrier part since both parts are applied in immunochromatographic test strips.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Response to Arguments

24. On pages 8-11 of the Remarks, filed 14 February 2005, Applicants contend that Killeen et al do not anticipate the claimed invention because the biosensor of Killeen et al prevents red blood cells from entering the detection zone, whereas the cell shrinkage reagent holding part of the present application "makes the blood specimen developed" (see page 9, 3rd paragraph). In addition, Applicants contend that the present application uses shrunk blood cells "that are moved together with the blood plasma", whereas

Killeen et al discloses only blood plasma that is developed in the development zone (see page 10, 2nd paragraph). Furthermore, Applicants contend that Killeen fails to include or suggest a biosensor that includes a carrier "so as to develop same to the water absorbing part together with the liquid specimen" (see page 10, last paragraph).

Applicant's arguments have been fully considered but they are not persuasive. Applicants state that the difference between Killeen et al and the present application is the manner in which blood cells are used after being shrunk, and that the blood cells of Killeen et al are prevented from moving into the detection zone, whereas the blood cells of the present application may travel with the plasma. However, Applicants' argument is not wholly supported by the specification. Pages 27-28 of the specification clearly indicates that after cell components are shrunk, they are "caught in the fiber of the fabric or glass fiber filter paper in the maker reagent holding part and then separated. Accordingly, the liquid components penetrate the reaction layer quickly", which indicates that the shrunk cell components in the present application are also prevented from entering the detection zone. Although the cell components of the present application may move through the specimen addition part of the biosensor after being shrunk and prior to being immobilized in the marker reagent holding part, this teaching is also provided by Killeen et al, as stated in the 35 U.S.C. 102(b) rejection above, wherein crenated red blood cells are immobilized only at the interface between the overlay membrane and the detection zone membrane, but may move through the overlay membrane after being crenated. With regards to Applicants' statement that Killeen fails to include or suggest a biosensor that includes a carrier "so as to develop same to the

water absorbing part together with the liquid specimen", the claims do not recite this limitation and the argument is therefore moot. In light of the statements presented against Applicants' arguments, the 35 U.S.C. 102(b) rejection made in the previous Office Action is therefore maintained.

25. On page 10 of the Remarks, Applicants state that Killeen et al reference "requires a support onto which the biosensor is laid with respective constitutional elements arranged close to each other" and that the present application requires "respective constitutional elements having the same thicknesses and rectangular shapes" and "as a result, the present biosensor is more compact" (see page 10, 3rd paragraph).

Applicant's arguments have been fully considered but they are not persuasive. The claims do not recite any physical limitations on the biosensor. Therefore, Applicants' argument is moot and the 35 U.S.C. 102(b) rejection is maintained.

26. Due to the submission of the required documents specified in the previous Office Action and explanations provided by the Applicants on pages 12-13 of the Remarks, the previous objections to Applicants' claim for foreign priority and the IDS documents filed on 13 May 2002 and 11 February 2003 have been withdrawn.

Applicants' admission that the SU 1,140,462 only provides background material and does not disclose specific reference to claimed subject matter is acknowledged.

Conclusion

27. No claims are allowed.

28. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leon Y. Lum whose telephone number is (571) 272-2878. The examiner can normally be reached on weekdays from 8:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long Le can be reached on (571) 272-0823. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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